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wherein said signal plan comprises a plurality of radio frequency carrier signals;

wherein each of said carrier signals is modulated by a direct sequence spreading code in a Bipolar Phase Shift Key- (BPSK) manner;

and wherein said carrier signals and said spreading codes are chosen such that immediate carrier cycle ambiguity resolution is possible, meaning an unambiguous precise measurement of the range between two receivers, accurate to a fraction of the wavelength of the highest carrier frequency in said plan, can be derived from a single sample period of code and carrier phases, said phases being simultaneously measured by each of the two receivers;

and wherein said modulated carrier signals are further designed to provide a significant range of operation, meaning they may be utilized throughout the majority of the volume encompassed by said plurality of pseudolite transmitters;

and wherein said plurality of pseudolite transmitters can provide all necessary information for a user receiver to navigate in the vicinity of said pseudolite transmitters when said plurality numbers four or more;

and wherein said plurality of pseudolite transmitters can augment a Global Navigation Satellite System so that a user receiver can navigate from incomplete GNSS information in the vicinity of said pseudolite transmitters when said plurality numbers one or more;

and wherein said reference receiver and said communication link provide differential code and carrier measurements to a user receiver.

2. (Once Amended Herein) **[The pseudolite of claim 1, wherein the signals are C/A code signals]**

The system of claim 1, wherein said signal plan comprises two or more frequencies in bands that can be used free from special government licensing.

3. (Once Amended Herein) **[The pseudolite of claim 1, wherein the signals are from the same family of 1023 codes as GPS satellite signals]**

The system of claim 1, wherein said signal plan comprises two or more frequencies from the Industrial, Scientific, and Medical (ISM) bands, 902-928 MHz, 2400-2483.5 MHz, and 5725-5875 MHz.

4. (Once Amended Herein) **[The pseudolite of claim 1, wherein the signals are from the same family of 1023 codes as GPS satellite signals and are not L1 frequencies]**

The system of claim 1, wherein said signal plan employs GPS C/A-codes or P-codes as the BPSK spreading code.

5. (Once Amended Herein) [A multi-frequency receiver comprising:
an oscillator, defining a clock; and
multiple GPS receivers, communicatively coupled to and clocked by the oscillator, for receiving L1 (1575.42MHz) GPS C/A code signals and signals from the same family of 1023 codes as the GPS satellite signals are drawn from]

The system of claim 1, wherein said immediate cycle ambiguity resolution property is achieved using two or more carrier frequencies and code chipping rates higher than GPS code chipping rates, that is, higher than 1.023 MHz for C/A code and higher than 10.23 MHz for P-code.

6. (Once Amended Herein) [A receiver comprising:
multiple frequency translators, for converting signals received on respective different multiple frequencies that are not a predetermined frequency to the predetermined frequency; and
multiple GPS receivers, communicatively coupled to respective ones of the multiple frequency translators]

The system of claim 1, wherein said immediate cycle ambiguity resolution property is achieved using three or more carrier signals and code chipping rates similar to GPS code chipping rates.

7. (Once Amended Herein) [The receiver of claim 5, wherein the predetermined frequency is the GPS L1 frequency (1575.42MHz)]

The system of claim 1, wherein said range-of-operation property is achieved by modulating exclusively with code sequences of sufficient length to provide the cross-correlation margin needed to operate over the desired range.

8. (Once Amended Herein) [A bank of N-channel GPS receivers and attached frequency converters with antennae located at a fixed and precisely known (surveyed) location, called a "Reference Receiver", that measures all of the code and carrier phase relationships between all of the signals transmitted by all of the pseudolites in view, one or more Mobile Receivers electronically configured the same as a Reference Receiver, and a data link connecting the Mobile Receivers to the phase data collected by the Reference Receiver]

The system of claim 1, wherein said range-of-operation property is achieved by pulsing the pseudolite output signal in a TDMA manner, and thereby synchronizing the pulse timing of all pseudolites in the system such that no two pseudolite signals overlap in time.

9. (Once Amended Herein) [A reference receiver joined with each pseudolite, data broadcast over RF ranging signal, no requirement for separate reference receiver and radio communications link]

The system of claim 1 wherein said data communication link is a radio modem.

10. (Once Amended Herein) [A computational process for determining the carrier phase integer ambiguities for each received pseudolite signal that

is based on the preserved and observed time and phase alignment between the code and carrier portions of the transmitted multi-frequency pseudolite signals]

The system of claim 1 wherein said data communication link is achieved by digitally modulating the data onto the pseudolite spreading code at a rate sufficiently lower than the code chipping rate such that both the code and data can be recovered by a user receiver.

11. (New) The system of claim 1 wherein each of said plurality of pseudolites further comprises a reference receiver, said reference receiver providing synchronization to a GNSS.

12. (New) The system of claim 1 wherein each of said plurality of pseudolites share a common oscillator, said oscillator providing system synchronization.

13. (New) A multi-frequency receiver, comprising the signal plan of claim 1, an antenna, an oscillator, a plurality of phase tracking units, a data communication link, and a processor;

wherein said antenna may receive satellite or pseudolite signals;

and wherein each of said plurality of phase tracking units is able to track code and carrier phases of a single frequency in said signal plan for a plurality of said received satellite or pseudolite signals;

and wherein said data communication link receives code and carrier phase measurements of the same satellites or pseudolites made by a reference receiver;

and wherein said processor has a memory and an algorithm;

wherein said memory contains the locations and code numbers of all satellites and pseudolites in view, and the location of said reference receiver;

and whereby said processor collects said code and carrier phase measurements from said phase tracking units, and also collects said code and carrier phase measurements from said communication link, and executes said algorithm to generate from a single time sample of said phase measurements, a precise position solution;

wherein said precise position solution has with very high probability an accuracy of much better than a fraction of the wavelength of the highest frequency carrier in said signal plan.

14. (New) A multi-frequency pseudolite transmitter comprising the signal plan of claim 1, an oscillator, a control processor, a spread spectrum code generator, a plurality of signal generators, a signal combiner, and a transmit antenna;

wherein each of said signal generators is comprised of a phase-locked loop circuit that derives from said oscillator one of said carrier signals of said signal plan;

and wherein said carrier signal is further modulated by a direct sequence spreading code in a Bipolar Phase Shift Key- (BPSK) manner and filtered;

and wherein each of said modulated carrier signals is combined in said signal combiner and transmitted through an antenna in conjunction with each of the other modulated carriers from said signal plan.

15. (New) The pseudolite of claim 14, also comprising a pulse generator and an RF switch, wherein said pulse generator receives time synchronization via said oscillator and serves to time-division multiplex the transmission of said modulated carrier signals through said RF switch, such that no two signals from different pseudolites overlap in time.

16. (New) A method comprising the signal plan of claim 1, and an algorithm to convert a single time sample of multiple code and carrier phases into an unambiguous precise range measurement to an accuracy better than a fraction of the wavelength of the highest frequency carrier in said signal plan;

wherein said algorithm consists of forming a probability a density function for each code and carrier phase pair, and then superimposing all said probability density functions in order to discern the resulting unambiguous precise range measurement.

A clean version of the claims is attached.

REMARKS

Claims 1-10 are pending in the Application. Applicants herein amend claims 1-10 and add claims 11-16. Entry, re-examination and re-consideration are respectfully requested.

The Examiner has objected to the drawings as failing to comply with 37 CFR 1.84(p)(5), particularly with respect to the multi-frequency pseudolite system 7. Applicants herewith submit red-lined Figures 1-3 for the Examiner's approval. These new figures show the multi-frequency pseudolite system 7. Accordingly, Applicants respectfully request that the objection to the drawings be withdrawn.

The Examiner has objected to the specification, particularly as it refers to GPS receivers 305. Applicants herewith amend the references to GPS